

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 08 March 2001 (08.03.01)	
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International filing date (day/month/year) 12 July 2000 (12.07.00)	Priority date (day/month/year) 12 July 1999 (12.07.99)
Applicant RAWSON-HARRIS, Douglas	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 12 February 2001 (12.02.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Claudio Borton Telephone No.: (41-22) 338.83.38
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(19) World Intellectual Property Organization
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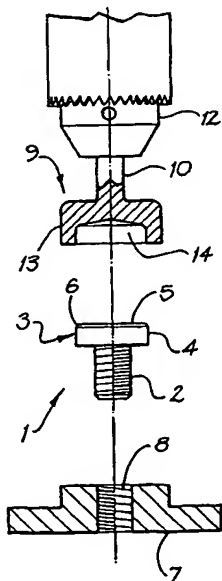
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(10) International Publication Number
WO 01/04501 A1

- (51) International Patent Classification⁷: **F16B 41/00**, 23/00, 43/00 (74) Agent: **GRIFFITH HACK**; Level 8, 168 Walker Street, North Sydney, NSW 2060 (AU).
- (21) International Application Number: **PCT/AU00/00834** (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
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(75) Inventor/Applicant (*for US only*): **RAWSON-HARRIS, Douglas [AU/AU]**; 2/81 Bassett Street, Mona Vale, NSW 2103 (AU).
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- Published:
— *With international search report.*
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: **SECURITY SCREW**

(57) Abstract: The present invention relates generally to a security screw (1) having a threaded shank portion (2) and head portion (3). The head portion (3) is characterised by having a circular profile with a cylindrical peripheral wall (4) and a smooth crown (5) without any tool engagement slots, recesses or other profile in contrast to a conventional screw. The security screw (1) is driven into place by way of a driving tool (9) having a shank portion (10) adapted to be rotated by a suitable implement such as a power drill. The driving tool (9) further comprises a cup portion (13) incorporating a cylindrical recess (14) coaxial with the shank (10). The recess (14) is sized and shaped to fit over the head portion (3) of the screw (1).



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SECURITY SCREWField of the Invention

5 This invention relates to a security screw and has been devised particularly though not solely for the fastening together of components in structures requiring a vandal proof or tamper proof installation.

Background of the Invention

10 There are many situations where it is necessary to fasten together components of a structure or apparatus which are to be used in an environment which is susceptible to vandalism or unauthorised tampering. The present security screw has been devised particularly for use in
15 fastening components such as street signs, banner arms and other fittings to roadside poles or other similar installations. It is envisaged however that a security screw of this type has a much wider application such as the fastening of window locks or door locks or in any other
20 situation where a screw type fastener must be secured by an authorised user while yet remaining difficult or impossible to release by an unauthorised user.

Summary of the Invention

25 In one aspect, the present invention provides a security screw comprising a threaded shank portion and a head portion, the head portion being characterised by having a circular profile about the axis of the shank portion and a smooth exposed surface without any tool
30 engagement slots or discontinuities.

Preferably the exposed surface of the head portion is in the form of a dome-shaped crown. Alternatively the exposed surface is substantially flat with a rounded shoulder to a cylindrical periphery of the head portion.

35 Alternatively the exposed surface of the head portion includes a recess of a symmetrical configuration which is disposed coaxial with the threaded shank portion.

Preferably the recess is at least partly hemispheroidal.

Preferably the security screw is manufactured by the so-called "cold headed" process from a corrosion resistant material such as austenitic stainless steel.

5 Preferably the screw is manufactured from 316 or 304 stainless steel.

10 In a further aspect the present invention provides a driving tool for a predetermined security screw of the type comprising a threaded shank portion and a head portion, the head portion of the security screw being characterised by having a circular profile about the axis of the shank portion and a smooth exposed surface without any tool engagement slots or discontinuities, the driving tool comprising a shank portion adapted to be rotated by a
15 suitable implement and a head engaging portion incorporating a friction drive surface which is coaxial with the shank portion, the friction drive surface being configured to fit over the head portion of the screw so as to provide a friction drive between the head engaging
20 portion and the security screw when the driving tool is rotated by the implement.

Preferably the shank portion of the driving tool is adapted to fit into the chuck of a power drill.

25 Preferably the frictional drive surface in the head engaging portion is at least in part shaped complementary to the exposed surface of the head portion of the security screw.

Preferably the head engaging portion includes a concave recess such as a female dome-shaped recess.

30 Alternatively the frictional drive surface in the head engaging portion includes a recess having a substantially cylindrical wall immediately adjacent a mouth of the recess, an inwardly turned shoulder portion adapted to bear against a shoulder portion of the head portion of
35 the screw, and a base portion which is deeper in the centre than in the peripheral regions, so that the centre of the recess does not bear against a crown on the head of the

screw.

Alternatively the frictional drive surface in the head engaging portion is at least in part dome-shaped and adapted to frictionally engage a corresponding recess in the head portion of the screw.

Preferably at least the head engaging portion of the driving tool and the head portion of the security screw are manufactured from the same material. Typically the entire driving tool and the entire security screw are manufactured from the same material.

Preferably the material is an austenitic stainless steel such as 316 or 304 stainless steel.

One important embodiment of the invention is one in which the driving tool has a head engaging portion with an outer circular shape which is substantially of the same diameter as the head portion of the security screw. This embodiment permits a further inventive development to be used namely the combination of a security washer for use with the security screw, the washer having an upstanding collar portion which surrounds the head portion of the screw thereby preventing access of a tool to the peripheral portion of the head portion of the screw.

Thus, a further inventive aspect is a security screw having a head portion and a threaded shank portion, and a complementary washer which fits on the screw and has an upstanding collar portion which, in use, surrounds the head portion to prevent access to the periphery of the head portion with tools for unscrewing the screw, the screw head portion having a circular profile about the axis of the shank portion and a smooth exposed surface without any tool engagement slots or discontinuities such that torque may be applied to the screw through a driving tool having a screw engagement portion the exterior profile of which is circular and substantially of the same diameter as the head portion of the screw and an interior profile which is at least in part complementary to a portion of the profile of the smooth exposed surface.

Preferably the smooth exposed surface is dome-shaped. Alternatively, the smooth exposed surface has a smoothly rounded shoulder defining an edge surface portion and the shoulder is adapted to be engaged frictionally by a concave complementary portion of the driving tool.

Alternatively the exposed surface of the head portion includes a recess of a symmetrical configuration and disposed coaxial with the threaded shank portions. Preferably the recess is at least partly hemispheroidal.

For good torque transmission characteristics, the material of the screw and driving tool is preferably the same, e.g. stainless steel.

In section the rounded shoulder is preferably part-circular.

For higher security, the washer preferably has an inner edge portion which, in use, extends axially above the top of the exposed surface and the washer is of a hard material, such as hardened steel, to resist cutting of the washer and cutting of the head portion. This increases the resistance to unscrewing with ordinary tools, but the special driving tool can be used to remove the screw.

Brief Description of the Drawings

Notwithstanding any other forms that may fall within its scope, one preferred form of the invention will now be described by way of example only with reference to the accompanying drawings in which:

Fig. 1 is a diagrammatic perspective view of a security screw and a driving tool according to one embodiment of the invention with the driving tool engaged in the chuck of a power drill;

Fig. 2 is a diagrammatic longitudinal cross section through the aligned axes of the driving tool, security screw, and a corresponding mounting nut;

Fig. 3 is a similar cross section to Fig. 2 showing the head of a security screw engaged with a driving tool according to one embodiment of the invention;

Fig. 4 is a schematic cross-section through another embodiment showing installation on a workpiece; and

Fig. 5 is a schematic cross-section of further embodiments of a security screw and driving tool.

5

Detailed Description of the Preferred Embodiments

In the embodiment of Figs 1-3, a security screw 1 is provided having a threaded shank portion 2 and a head portion 3. The head portion 3 is characterised by having a circular profile and a smooth exposed surface which in this example includes a cylindrical peripheral wall 4 and a smooth crown 5 without any tool engagement slots, discontinuities or other profile in contrast to a conventional screw. The crown 5 is typically flat, merging into the cylindrical side wall 4 by way of a rounded shoulder 6.

The screw 1 is driven into place e.g. by engaging with a mounting nut 7 having a female thread 8 by way of a driving tool 9 having a shank portion 10 adapted to be rotated by a suitable implement such as a power drill 11. To this end, the shank 10 of the driving tool 9 is engageable in the chuck 12 of the power tool in the well known manner. The driving tool 9 further comprises head engaging portion in the form of a cup portion 13 incorporating a cylindrical recess 14 coaxial with the shank 10. The recess 14 is sized and shaped to fit over the head portion 3 of a screw such as 1 as will be explained with reference to Figure 3.

The recess 14 in the cup portion 13 has a cylindrical side wall 15 immediately adjacent the mouth 16 of the recess transitioning into an inwardly curved shoulder portion 17 adapted to engage and bear against the shoulder portion 6 of the screw 1. The base of the cylindrical recess 14 is deeper at its centre portion 18 than at the shoulder portion 17 so that the centre of the recess 14 does not bear against the flat crown 5 of an engaged screw. To this end the base portion is typically a shallow conical

surface in configuration.

In use, when it is desired to fasten a component in place in a secure manner, the component is aligned where desired and the security screw 1 offered up to the mounting nut 7 and rotated to a "finger tight" engagement by the operator. The cup portion 13 of the driving tool 9 is then located over the head 3 of the security screw 1 and force exerted through the power tool 11 as shown by arrows 18 (Fig. 1) forcing the recess 14 in the cup portion 13 of the driving tool 9 into contact with the head 3 of the security screw 1. The driving tool 9 is then rotated by the power drill 11, in turn rotating the head 3 of the screw 1 by frictional engagement between the screw head 3 and the cup 13 of the driving tool 9, until the screw 1 is firmly in place.

It is a particular feature of the security screw 1 that the screw 1 can be removed at any time by authorised personnel having a suitable driving tool, by engaging the tool as previously described and rotating the drill in an anti-clockwise direction to undo the screw 1. In this sense the security screw 1 according to this embodiment of the invention is quite different from known prior art types of security screws which have "one way" screwdriver slots or ramps incorporated in the head of the screw.

Although the operation of the security screw will work to some degree with a wide range of materials used for both the screw and the driving tool, it has been found that for an efficient and consistent operation the head of the screw and the cup portion of the driving tool should be made of the same materials. In practice this normally means that the entire security screw and driving tool are formed from the same material. The material is typically a metal and it is believed that the invention will work with a wide range of metals such as brass or black steel, but has been found particularly effective when both the screw and the driving tool are manufactured from austenitic stainless steel.

It is quite common to manufacture stainless steel screws from austenitic stainless steel such as 304 or 316 stainless steel and such screws are both tough in use and corrosion resistant. The screws are commonly made by the so-called "cold heading process".

By manufacturing the security screws according to an embodiment of the invention by a similar process, but without any tool engagement slots or discontinuities, it is relatively simple and inexpensive to provide a corresponding driving tool made from an identical material e.g. from 304 or 316 stainless steel.

By matching the materials in the security screw and the driving tool in this manner, and by providing a frictional engagement between the head of the screw and the head engaging portion of the driving tool, it has been found that an effective friction drive can be provided which enables a screw to be fastened to a desired torque which will make it extremely difficult for unauthorised removal of the screw due to the smooth nature of the crown of the screw which does not provide any surfaces for engagement with a conventional tool such as a screwdriver or allen key and which furthermore is difficult to grip using pliers or the like. A screw so fastened, can however be readily removed by an authorised user having a driving tool made according to an embodiment of the invention.

Fig. 4 shows a particularly advantageous and enhanced aspect of the invention where extra protection against an unauthorised unscrewing of the screw is required. Like parts have been given like reference numerals. In this embodiment a significant extra component is a generally part conical washer 20 through which the screw shank 2 fits, the washer having typically a flat base surface 21 for abutting a workpiece 22, a central cylindrical recess 23 for accommodating the head portion 4 of the screw 1 and a part conical outer surface 24 which terminates in a lip 25 upstanding above the top of the crown of the screw.

Preferably the washer 20 is a relatively hard

material such as tool steel suitably plated to resist corrosion and such a hardened steel resists cutting with conventional tools such as hacksaws and the washer thus enshrouds the head of the screw to prevent access with grippers or other ordinary tools.

5 Fig. 4 shows schematically an installed situation where a workpiece comprises an outer sheet of material 26 and an overlapped inner sheet of material 27 with an aligned aperture for accommodating the shank 2 of the screw 1 and a nut such as a capped nut 7 is provided on the inner surface of the sheet 27.

10 In this embodiment the driving tool 30 has a shank 31 for mounting in an electric drill conventionally and a head portion 32 which has an outer circular profile substantially the same as the head of the screw so that its leading edge portion can extend below the upstanding lip 25 and into the recess 23. The interior profile of the driving tool includes a concave shoulder 33 which is complementary to the curved shoulder on the edge of the crown of the screw. Typically the sectional shape is part circular and the curve commences substantially at the junction of the shoulder with the outer cylindrical profile.

25 Figure 5 illustrates two further variants of a screw 50 and a driving tool 51 according to the invention. In one example the head 52 of the screw 50 is generally dome-shaped and the driving tool 51 includes a head engaging portion 53 which has a recess 54 shaped complementary to the dome-shaped head 52 of the screw 50. The dome-shaped head 52 is shaped so that it cannot be gripped, and in particular about its perimeter, with pliers or the like for unauthorised removal. That is, unlike the preceding embodiments, the head 52 of the screw 50 does not include a cylindrical perimeter wall.

35 The alternate embodiment shown in Figure 5 includes a recess 55 formed in the head 52 of the screw 50. The recess 55 is smooth and without slots or discontinuities

and, in this example, includes a hemispheroidal recess 56 formed coaxial with the screw 50. The driving tool 51 has a head engaging portion 53 which is at least partly ball-shaped and generally complementary to the hemispheroidal recess 56 of the screw head 52. The alternate screw 50 is designed to be used in conjunction with the security washer 24 which is similar in shape to the previous washer. The security washer 24 together with the alternate screw 50 minimises any likelihood of the head 52 of the screw 50 being gripped by pliers or the like. Like components of the embodiments of Figure 5 have been designated with the same reference numerals in order to avoid repetition.

It should also be appreciated that the frictional drive surface of the head engaging portion such as 13, 32 or 53 can be varied to increase or decrease the torque applied to the screw such as 2 or 50. Similarly, the material and/or surface roughness of the friction drive surface and corresponding exposed surface of the head of the screw may be varied depending on the torque required to be applied. The driving tool may also be used with a grit finish to promote frictional engagement between the friction drive surface of the driving tool and the corresponding head portion of the screw. The friction drive surface may entirely or only partly engage the head portion of the screw depending on the torque or driving force which is to be imparted to the screw. A temporary adhesive with strong sheer strength may also promote frictional engagement between the driving tool and the head of the screw. The friction drive surface need not be shaped complementary so as to "fit" the head of the screw but rather may be designed to wear with use where after time the mutually engaging surfaces are shaped generally complementary to one another.

Those skilled in the art will appreciate that the invention described herein is susceptible to variations and modifications other than those specifically described. For example, neither the head portion of the screw nor the

friction drive surface of the driving tool are limited to the shapes described provided they broadly fall within the scope of the claimed invention.

- 5 All such variations and modifications are to be considered within the scope of the present invention the nature of which is to be determined from the foregoing description.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A security screw having a head portion and a threaded shank portion, and a complementary washer which fits on the screw and has an upstanding collar portion which, in use, surrounds the head portion to prevent access to the periphery of the head portion with tools for unscrewing the screw, the screw head portion having a circular profile about the axis of the shank portion and a smooth exposed surface without any tool engagement slots or discontinuities such that torque may be applied to the screw through a driving tool having a screw engagement portion the exterior profile of which is circular and substantially of the same diameter as the head portion of the screw and an interior profile which is at least in part complementary to a portion of the profile of the smooth exposed surface.
2. A security screw arrangement as defined in claim 1 wherein the smooth exposed surface is dome-shaped.
3. A security screw arrangement as defined in claim 1 wherein the smooth exposed surface has a smoothly rounded shoulder defining an edge surface portion and the shoulder is adapted to be engaged frictionally by a concave complementary portion of the driving tool.
4. A security screw arrangement as defined in claim 1 wherein the exposed surface of the head portion includes a recess of a symmetrical configuration and disposed coaxial with the threaded shank portion.
5. A security screw as defined in any one of the preceding claims wherein the washer has an inner edge portion adapted to extend axially above the top of the exposed surface of the screw and the washer is of a relatively hard material to resist cutting of the washer.
6. A method of installing or connecting components using a screw in a manner to resist unscrewing, the method comprising using a security screw and washer as defined in any one of the above claims and using a driving tool to

apply torque to the screw by entering engagement of a friction drive surface of the driving tool which is at least in part shaped complementary to a portion of the smooth exposed surface of the head portion of the screw.

5 7. A security screw comprising a threaded shank portion and a head portion, the head portion being characterised by having a circular profile about the axis of the shank portion and a smooth exposed surface without any tool engagement slots or discontinuities.

10 8. A security screw as defined in claim 7 wherein the exposed surface of the head portion is in the form of a dome-shaped crown.

 9. A security screw as defined in claim 7 wherein the screw is manufactured from 316 or 304 stainless steel.

15 10. A driving tool for a predetermined security screw of the type comprising a threaded shank portion and a head portion, the head portion of the security screw being characterised by having a circular profile about the axis of the shank portion and a smooth exposed surface without any tool engagement slots or discontinuities, the driving
20 tool comprising a shank portion adapted to be rotated by a suitable implement and a head engaging portion incorporating a friction drive surface which is coaxial with the shank portion, the friction drive surface being
25 configured to fit over the head portion of the screw so as to provide a friction drive between the head engaging portion and the security screw when the driving tool is rotated by the implement.

30 11. A washer being adapted to locate under a head portion of a screw, the washer comprising an upstanding collar portion which is adapted to surround the head portion of the screw thereby preventing access of a tool to a peripheral portion of the head portion of the screw.

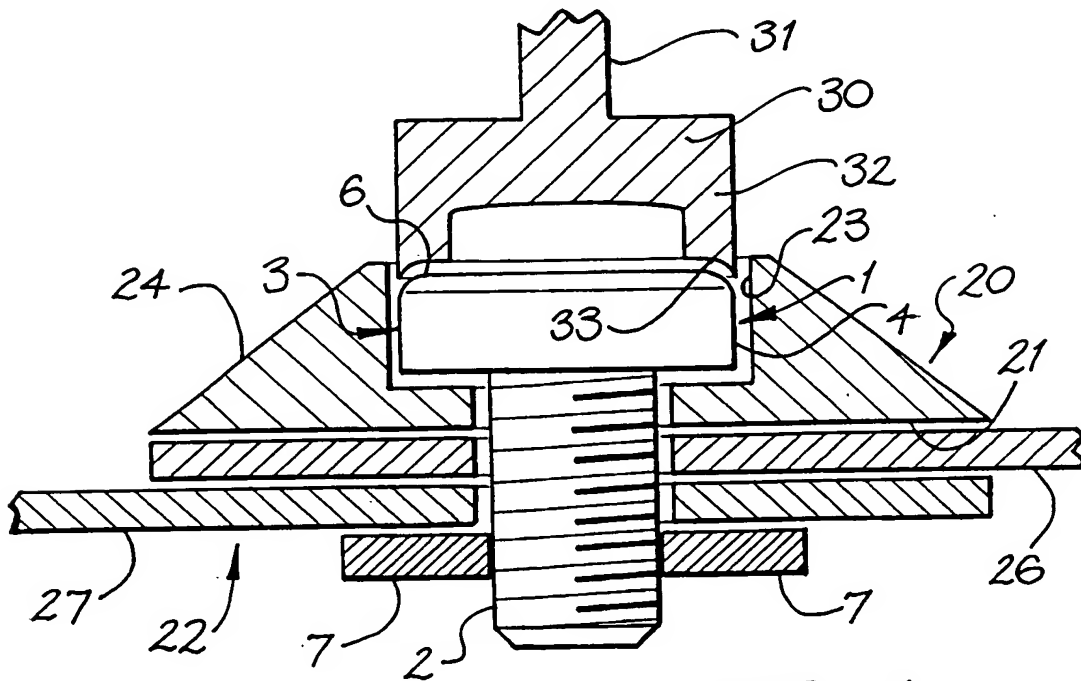


FIG. 4

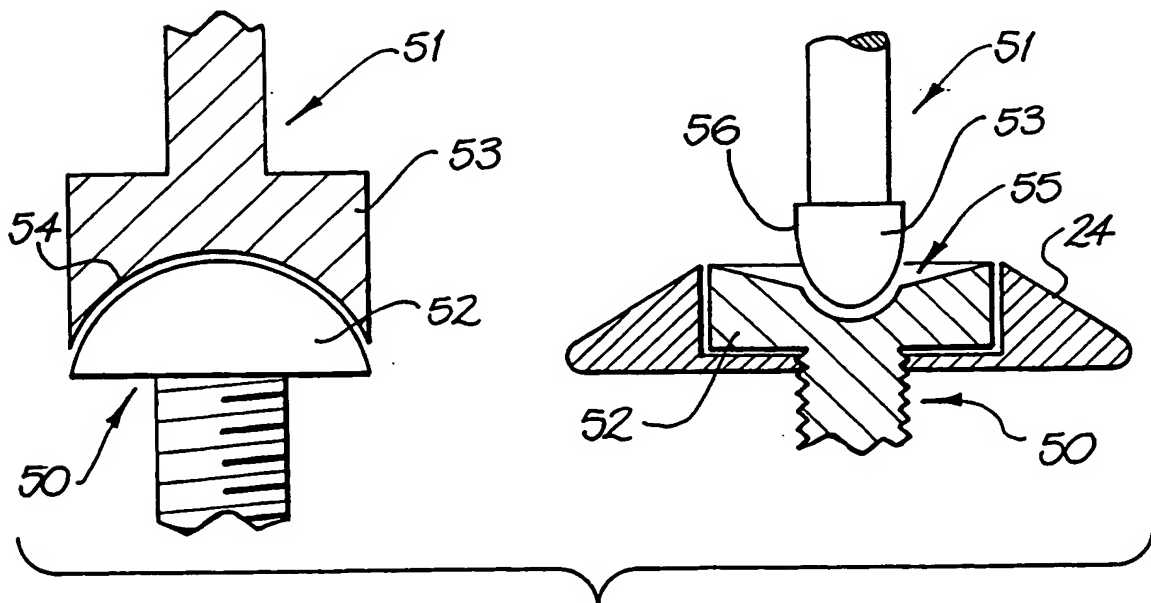


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 00/00834

A. CLASSIFICATION OF SUBJECT MATTER		
Int Cl ⁷ : F16B 41/00, 23/00, 43/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) IPC F16 B 41/00, 23/00, 43/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU: IPC as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) USPTO, IBM,DWPI		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	AU 52150/73 (475880) B (OKADA) 15 August 1974 Whole document	1-3, 6-10 5
X Y	AU 26936/71 (427016) B (AUSTRALIAN SCREW CO. PTY. LIMITED) 31 August 1972 Whole document	1-3, 6-10 5
X Y	US 4171662 A (SIMONE et al) 23 October 1979 Whole document, particularly figs 15 - 17	1-4, 6-10 5
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
<p>* Special categories of cited documents:</p> <p>"A" Document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>		
Date of the actual completion of the international search 14 August 2000		Date of mailing of the international search report 10 OCT 2000
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No.: (02) 6285 3929		Authorized officer B. NGUYEN Telephone No.: (02) 6283 2306

INTERNATIONAL SEARCH REPORT

international application No.
PCT/AU 00/00834

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 4732517 A (CROUCH) 22 March 1988 Whole document	11 5
X Y	US 5904383 A (WAL) 18 May 1999 Whole document	11 5
X Y	US 4225165 A (KESSELMAN) 30 September 1980 Whole document	11 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU00/00834

Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos :
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos :
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos :
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU00/00834

Supplemental Box II

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: II

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that these are two inventions.

1. Claims 1-10 directed to a security screw and an assorted driving tool for driving this particular security screw. The screw is characterised by a head portion and a threaded shank portion, with the head portion having a circular profile about the axis of the shank portion and a smooth exposed surface without any tool engagement slots or discontinuities. It is considered that the characteristics of the head portion comprises a first "special technical feature".

2. Claim 11 directed to a washer being adapted to locate under a head portion of a screw, the washer comprising an upstanding collar portion adapted to surround the head portion of the screw. It is considered that the feature of "upstanding collar portion of the washer" comprises a second separate "special technical feature".

Since the above mentioned group of claims do not share either of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU 00/00834

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
AU	52150/73	BE	795984
		CH	561863
		DE	2241293
		ES	412144
		FR	2174590
		GB	1327719
		IT	962202
		JP	48087247
		NL	7302545
		US	3859888
		ZA	7301002
AU	26936/71	CA	1065922
		DE	2732596
		FR	2359003
		GB	1550300
		IT	1081136
		JP	53027919
		NL	7708205
		NZ	184631
		ZA	7704320
US	4171662	NONE	
US	4732517	AU	37426/85
		BR	8407142
		CA	1247408
		EP	162916
		US	4621230
		WO	8502447
US	5904383	NONE	
US	4225165	NONE	
END OF ANNEX			

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 00/00834

A. CLASSIFICATION OF SUBJECT MATTER		
Int Cl ⁷ : F16B 41/00, 23/00, 43/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) IPC F16 B 41/00, 23/00, 43/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU: IPC as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) USPTO, IBM, DWPI		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	AU 52150/73 (475880) B (OKADA) 15 August 1974. Whole document	1-3, 6-10 5
X Y	AU 26936/71 (427016) B (AUSTRALIAN SCREW CO. PTY. LIMITED) 31 August 1972 Whole document	1-3, 6-10 5
X Y	US 4171662 A (SIMONE et al) 23 October 1979 Whole document, particularly figs 15 - 17	1-4, 6-10 5
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
* Special categories of cited documents: "A" Document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 14 August 2000		Date of mailing of the international search report 10 OCT 2000
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No.: (02) 6285 3929		Authorized officer B. NGUYEN Telephone No.: (02) 6283 2306

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 00/00834

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 4732517 A (CROUCH) 22 March 1988 Whole document	11 5
X Y	US 5904383 A (WAL) 18 May 1999 Whole document	11 5
X Y	US 4225165 A (KESSELMAN) 30 September 1980 Whole document	11 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU00/00834

Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos :
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos :
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos :
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU00/00834

Supplemental Box II

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: II

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that these are two inventions.

1. Claims 1-10 directed to a security screw and an assorted driving tool for driving this particular security screw. The screw is characterised by a head portion and a threaded shank portion, with the head portion having a circular profile about the axis of the shank portion and a smooth exposed surface without any tool engagement slots or discontinuities. It is considered that the characteristics of the head portion comprises a first "special technical feature".

2. Claim 11 directed to a washer being adapted to locate under a head portion of a screw, the washer comprising an upstanding collar portion adapted to surround the head portion of the screw. It is considered that the feature of "upstanding collar portion of the washer" comprises a second separate "special technical feature".

Since the above mentioned group of claims do not share either of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU 00/00834

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
AU	52150/73	BE	795984
		CH	561863
		DE	2241293
		ES	412144
		FR	2174590
		GB	1327719
		IT	962202
		JP	48087247
		NL	7302545
		US	3859888
		ZA	7301002
AU	26936/71	CA	1065922
		DE	2732596
		FR	2359003
		GB	1550300
		IT	1081136
		JP	53027919
		NL	7708205
		NZ	184631
		ZA	7704320
US	4171662	NONE	
US	4732517	AU	37426/85
		BR	8407142
		CA	1247408
		EP	162916
		US	4621230
		WO	8502447
US	5904383	NONE	
US	4225165	NONE	

END OF ANNEX

11

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

JUN 2001
WIPO PCT

Applicant's or agent's file reference fp13078	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International application No. PCT/AU 00/00834	International filing date (<i>day/month/year</i>) 12 July 2000	Priority Date (<i>day/month/year</i>) 12 July 1999
International Patent Classification (IPC) or national classification and IPC Int. Cl.⁷ F16B 41/00, 23/00, 43/00		
Applicant GOODCART PTY LIMITED et al		

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.																								
2.	<p>This REPORT consists of a total of 4 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheet(s).</p>																								
3.	<p>This report contains indications relating to the following items:</p> <table style="width: 100%;"><tr><td style="width: 5%;">I</td><td style="width: 5%;"><input checked="" type="checkbox"/></td><td>Basis of the report</td></tr><tr><td>II</td><td><input type="checkbox"/></td><td>Priority</td></tr><tr><td>III</td><td><input type="checkbox"/></td><td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td></tr><tr><td>IV</td><td><input checked="" type="checkbox"/></td><td>Lack of unity of invention</td></tr><tr><td>V</td><td><input checked="" type="checkbox"/></td><td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td></tr><tr><td>VI</td><td><input type="checkbox"/></td><td>Certain documents cited</td></tr><tr><td>VII</td><td><input type="checkbox"/></td><td>Certain defects in the international application</td></tr><tr><td>VIII</td><td><input type="checkbox"/></td><td>Certain observations on the international application</td></tr></table>	I	<input checked="" type="checkbox"/>	Basis of the report	II	<input type="checkbox"/>	Priority	III	<input type="checkbox"/>	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	IV	<input checked="" type="checkbox"/>	Lack of unity of invention	V	<input checked="" type="checkbox"/>	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	VI	<input type="checkbox"/>	Certain documents cited	VII	<input type="checkbox"/>	Certain defects in the international application	VIII	<input type="checkbox"/>	Certain observations on the international application
I	<input checked="" type="checkbox"/>	Basis of the report																							
II	<input type="checkbox"/>	Priority																							
III	<input type="checkbox"/>	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability																							
IV	<input checked="" type="checkbox"/>	Lack of unity of invention																							
V	<input checked="" type="checkbox"/>	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement																							
VI	<input type="checkbox"/>	Certain documents cited																							
VII	<input type="checkbox"/>	Certain defects in the international application																							
VIII	<input type="checkbox"/>	Certain observations on the international application																							

Date of submission of the demand 12 February 2001	Date of completion of the report 13 June 2001
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer B. NGUYEN Telephone No. (02) 6283 2306

I. Basis of the report1. With regard to the **elements** of the international application:*

- ☒ the international application as originally filed.
- ☐ the description, pages , as originally filed,
 pages , filed with the demand,
 pages , received on with the letter of .
- ☐ the claims, pages , as originally filed,
 pages , as amended (together with any statement) under Article 19,
 pages , filed with the demand,
 pages , received on with the letter of .
- ☐ the drawings, pages , as originally filed,
 pages , filed with the demand,
 pages , received on with the letter of .
- ☐ the sequence listing part of the description:
 pages , as originally filed
 pages , filed with the demand
 pages , received on with the letter of .

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, was on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☒ not complied with for the following reasons:

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are two inventions.

1) Claims 1-10 directed to a security screw and an assorted driving tool for driving this particular security screw. The screw is characterised by a head portion and a threaded shank portion, with the head portion having a circular profile about the axis of the shank portion and a smooth exposed surface without any tool engagement slots or discontinuities. It is considered that the characteristics of the head portion comprises a first "special technical feature".

2) Claim 11 directed to a washer being adapted to locate under a head portion of a screw, the washer comprising an upstanding collar portion adapted to surround the head portion of the screw. It is considered that the feature of "upstanding collar portion of the washer" comprises a second separate "special technical feature".

Since the above mentioned group of claims do not share either of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist.

Accordingly the international application does not relate to one invention or to a single inventive concept. As all searchable claims could be searched without effort justifying an additional fee, this authority did not invite payment of any additional fee.

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
- ☐ the parts relating to claims Nos.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 5	YES
	Claims 1-4, 6-11	NO
Inventive step (IS)	Claims	YES
	Claims 1-11	NO
Industrial applicability (IA)	Claims 1-11	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

The following documents identified in the International Search Report have been considered for the purposes of this report:

D1 AU 52150/73
D2 AU 26936/71
D3 US 4171662
D4 US 4732517
D5 US 5904383
D6 US 4225165

NOVELTY (N) CLAIMS 1-4, 6-11.

Documents D1, D2, D3 disclose a security screw having the same features as defined in claims 1, 7 and 10. for example in D1, see the following comparison:

- A security screw having a threaded shank portion (1) and a circular profile of oval - section head (2) (page 4 lines 18-19).
- The head (2) having the shape of a truncated oval-section cone with a part-spherical surface (3) without any tool engagement slots or discontinuities-see page 4 lines 19-21.
- Fig. 4 of D1 shows a driving tool comprising a shank portion adapted to be rotated by a suitable implement, and a head engaging portion incorporating a friction drive surface which is configured to fit over the head portion of the screw.

Dependant claims 2, 3, 4 add features, which are clearly disclosed in D1, D2 and D3 hence these claims are not novel.

Dependent claims 6, 8 and 9 add features, which are either disclosed in the cited arts or are well known in the art.

Therefore these claims are also not novel.

Independent claim 11 defines a washer adapted to locate under a head portion of a screw. However, the features of the washer as claimed in claim 11 are anticipated in documents D4, D5 and D6. See for example washer (25) in D4, washer (35) in D5.

INVENTIVE STEP (IS) CLAIMS 1-11

Claims 1-4, 6-11 as above.

Claim 5 :

Documents D1, D2, D3 do not disclose a security screw with a complimentary washer as claimed in claim 5. However, documents D4, D5, D6 disclose the washer having the same features as in claim 5. Hence it would be obvious to a person skilled in the art to combine these documents, and this combination is obvious, to arrive with the security screw with the washer as claimed. Therefore claim 5 lacks an inventive step.